

Safety Considerations

The equipment covered by this manual is designed for safe and reliable operation within its design specification limits. To avoid personal injury or damage to equipment or property while installing or operating this equipment, it is essential that qualified, experienced personnel perform these functions using good judgment and safe practices. Equipment is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction. Equipment's maximum altitude of use is 2,200 m. See the following cautionary statements.

Danger

ELECTRICAL SHOCK HAZARDS. All power must be disconnected prior to installation and servicing this equipment. There may be more than one power source present. Insure that all power sources have been disconnected to avoid electrocution or shock injuries.

MOVING PARTS HAZARD. Motor and blower must be disconnected prior to opening access panels. Motors can start automatically; disconnect all power and control circuits prior to servicing to avoid serious crushing or dismemberment injuries.

BURN HAZARD. Electrical resistance heating elements must be disconnected prior to servicing. Electric heaters may start automatically; disconnect all power and control circuits prior to servicing to avoid burns.

Caution

The equipment covered by this manual is available with a variety of options and accessories. Consult the approved unit submittal, order acknowledgment and other manuals for details on the options and accessories provided with the equipment on each project. Safe practices regarding mechanical equipment must be followed at all times when handling, installing or servicing any unit. All power must be disconnected before any installation or service should be attempted. More than one power source may be supplied to the unit. Power to remote mounted control devices may not be supplied through the unit. Never wear bulky or loose fitting clothing when working with mechanical equipment. Gloves should only be worn when required for proper protection from heat or other possible injury. Safety glasses or goggles should always be worn when drilling, cutting or working with chemicals such as lubricants. Never pressurize any equipment beyond specified test pressures. The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during handling service or operation of any equipment.

Preface

Nailor Industries fan coils represent an investment, which can, when installed and operated properly, give long and trouble free service. Your equipment is initially protected under the manufacturer's standard warranty. However, this warranty is provided under the condition that the steps outlined in this manual for initial inspection, proper installation, periodic maintenance and everyday operation of the equipment be followed in detail. This manual should be

fully reviewed in advance of any actual work being done on the equipment. Should any questions arise, please contact your local Sales Representative or the factory before proceeding.

Unpacking and Inspection

All units have been carefully inspected, tested and packaged at Nailor's manufacturing facility. It is the responsibility of the receiving party to inspect the equipment upon arrival. Any obvious damage to the packaging and/or its contents should be recorded on the bill of lading and a claim should be filed with the freight carrier. After determining the condition of the unit's exterior, including all piping, each unit should be carefully removed from the package and inspected for hidden damage. Any hidden damage should be recorded and immediately reported to the carrier and a claim filed. Should a claim for shipping damage be filed, the unit, the shipping package and all packing must be retained for inspection by the freight carrier. All equipment should be stored in the factory shipping package until installation. At the time of receipt, the equipment type and arrangement should be verified against the order documents. Should any discrepancy be found the local sales rep should be notified immediately so that the proper action may be instituted. The factory must be notified about any questions concerning warranty repairs BEFORE any corrective action is taken. Should equipment require factory operations a Return Authorization Number will be issued. Any returns not marked with an authorization number will be refused. The manufacturer will not accept claims for expenses not authorized.

Receiving Inspection

After unpacking the fan coil unit, check it for shipping damage. If any shipping damage is found, report it immediately to the delivering carrier. Store units in a clean, dry location.

CAUTION: Do not use copper coil connections, drain pan connections, outside air inlet collar, damper shaft, airflow sensor, electrical conduit, or valve packages as a handle to lift or move assembly. Damage to the fan coil unit or controls may result.

Ship Loose Items

Items may often be shipped loose for field installation. These items are shipped loose to offer protection against shipping and job site damage or by customer request. Refer to packing slip. These items require the same inspection as the unit.

Minimum Access

Make appropriate accommodations for access panel removal. The 35FH units have access panels on the top, bottom and sides. Some access may be limited depending on options. The 37FH units have top and bottom access panels. Electrical enclosures have access panels that are equipped with hinges. Blowers, motors, coils and drain pans can be accessed and inspected from the bottom access panel. For clearances for full opening of hinged access doors, refer to project specifications, submittal sheets and NEC.

IMPORTANT: These recommendations do not preclude NEC or local codes that may be in effect, which are the responsibility of the installing contractor.

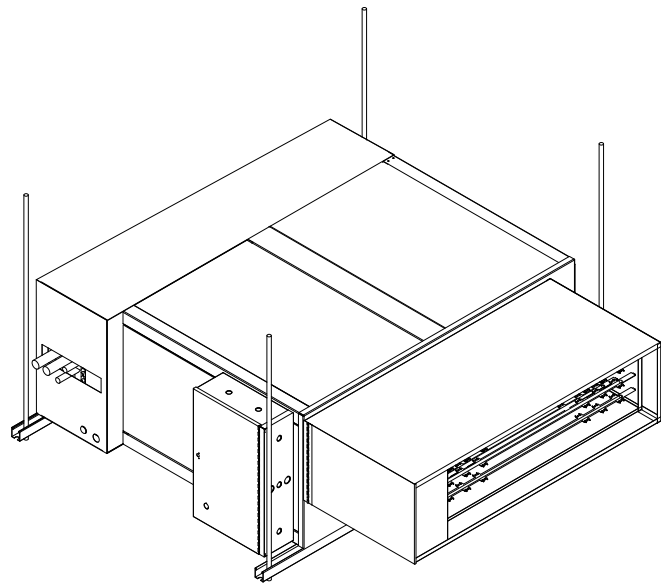
Dimensions are in inches (mm).

For units including valve package enclosures ensure that the access door to the valve package is not obstructed. Optional universal filter racks if selected provide access for filter replacement from the side or bottom of the rack. Consult relevant submittals and/or project plans detailing the location of these items.

Handling & Installation

Even though the Nailor fan coil unit is a sturdily constructed unit, great care should be taken when handling it. Care should be taken to protect the blower assembly, coil, piping, and drain stub outs during handling. The piping and blower assemblies should not be used as handles for lifting or moving the unit. Units may also have delicate internal components that could be damaged by improper handling. Care should be taken to prevent impact forces on the unit that may cause internal damage.

The units covered in this manual are not suitable for outdoor installation and should never be used for that purpose. The units

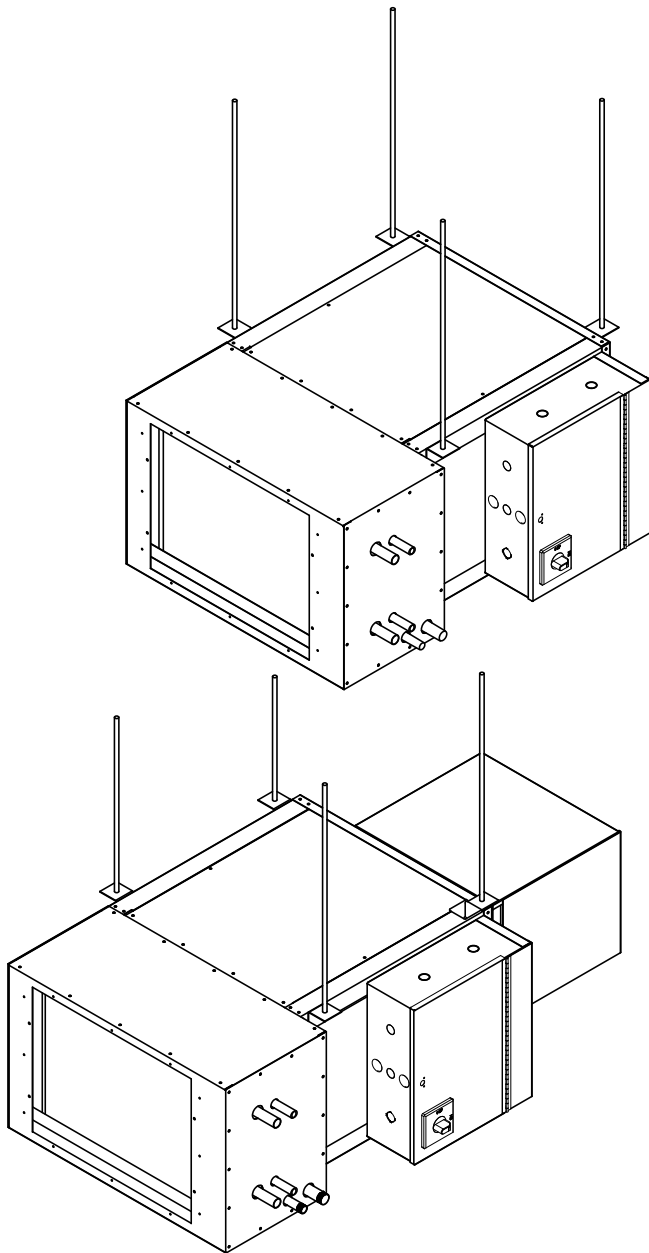


Fan Coil Unit Support Using Trapeze Suspension.

should never be stored or installed where they may be subjected to a harsh environment such as rain, snow, or extreme temperatures. Care should be taken to prevent any materials such as paint, plaster, drywall dust, and other construction materials from being deposited in the drain pan, heater, coils, or on the motor or blower wheels. Failure to do so may have negative effects on unit operation and may result in premature failure. To prevent contamination, the units should have some form of temporary covering placed over them during construction.

For model series 35FH & 37FH; suspend the unit from the building structure in a horizontal plane. Be careful not to obstruct the bottom access panels with support channels or straps. When requested, unit is supplied with field mounted hanger brackets for use with hanger rod up to 3/8" (9.5) diameter. Hanger brackets or straps should be screwed to the top corner posts, unit casing sides, or alternatively onto the inlet and outlet ends of the unit. Fan coil units are too heavy to suspend with the ductwork they must be independently supported. For the 35FH Size 30 & 40 it is advised that these units are mounted by a trapeze suspension. The unit must be mounted level. The drain pan has a built-in slope to ensure proper drainage. Field-furnished and installed accessories such as ductwork, mixing boxes, economizers, dampers, acoustical silencers and valve packages must be independently supported and must not rely on the unit for support.

After unit is mounted, the service connections such as water, drain and electrical can be made. At this time it should be confirmed that the proper types of service have been provided to the unit. The water connections should be checked for line size, temperature, and location. Electrical service to the unit should be compared to the unit nameplate to verify compatibility. The routing, and sizing of all piping, the type and sizing of all wiring and other electrical components such as circuit breakers, disconnects switches, etc. should be determined by the individual job requirements and should not be based on the size or type connections provided with the equipment. All installations should be made in compliance with all governing codes and ordinances. This compliance to all codes is the responsibility of the installing contractor.



Fan Coil Unit Support Using Hanger Brackets and Rods.

Dimensions are in inches (mm).

Ductwork

All ductwork and/or supply and return grilles should be installed in accordance with the project plans and specifications. The rectangular discharge opening is designed for a flanged duct connection. A clear area around the opening has been left for screw penetration. Fasten and seal all connections by method prescribed in the job specification. Zero clearance to combustible materials is allowed. The range of external static pressures for model series 35FH was tested at: 0 - 1" WC. The range of external static pressures for model series 37FH was tested at: 0 – 0.7" WC.

IMPORTANT: The dimension from the top of the unit to the top of the blower opening changes as the unit is configured for left or right-hand controls orientation. The unit submittal should be consulted to determine appropriate location of unit discharge to facilitate ductwork design.

For outside air inlet duct connections slip each inlet duct over the inlet collar of the outside air connection. Fasten and seal the connection by the method prescribed in the job specification. The diameter of the inlet duct in inches must be equal to the nominal size of the outside air inlet. The outside air inlet collar is 1/8" (3) smaller than the nominal duct size to allow it to fit inside the duct.

IMPORTANT: Do not insert ductwork inside the inlet collar of the assembly. For optimum performance, 2 to 3 equivalent diameters of straight duct should be installed prior to the outside air inlet of the unit. All ducts should be installed in accordance with SMACNA guidelines.

Coils & Valve Package

All valve components should be installed as required, and all service valves should be checked for correct operation. If coil and valve package connections are to be made by braze or solder, care should be taken to assure that no components in the valve package are subjected to a high temperature which may damage seals or other materials. Valve bodies should be wrapped with a wet rag to help dispel heat during brazing or soldering operations. Protect adjacent flammable materials when brazing. Use flame and heat protection barriers where needed. The chilled water valve package should be installed such that all pipes and fittings that extend beyond the drain pan are contained in the auxiliary drain pan or other device or insulated to prohibit sweating. All piping leading to the unit must be sufficiently supported to avoid excessive stress on the unit's piping. However, adequate free movement is required for thermal expansion/contraction. If union connections are used, backup wrenches must be used during any tightening process to keep the copper tube or fitting from being damaged. Nailor will not accept any responsibility for improper tightening procedures that damage the connections.

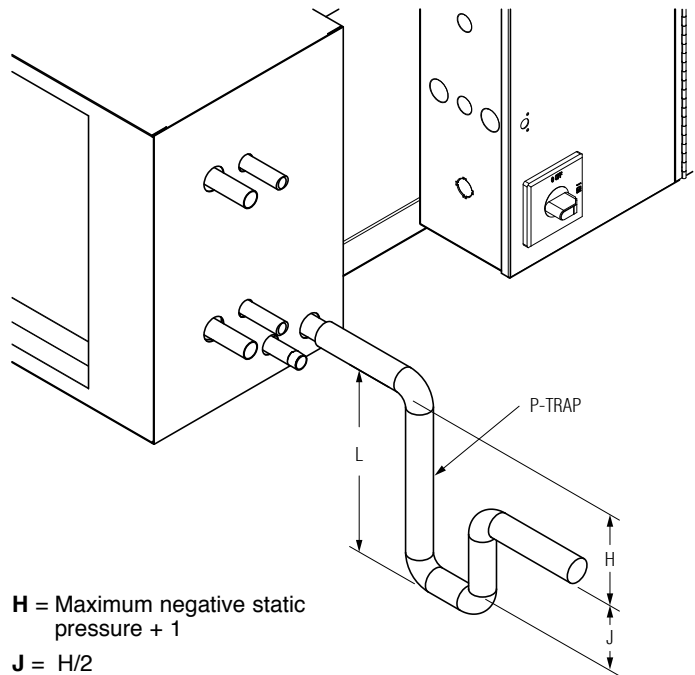
Factory installed threaded connections have been tightened and tested at the factory before shipping. These connections must be checked for tightness in the field before unit is put into service to ensure fittings did not loosen due to shipping vibration. Any connection found to be loose must be tightened. Nailor will not be held responsible or accept any charges for tightening loose fittings. After the connections are completed, the system should then be tested for leaks. All water coils must be protected from freezing after initial water fill. Even if the system is drained unit coils may still retain enough water to cause damage if exposed to temperatures below freezing. Shutoff ball valves when ordered as a valve package accessory will always ship loose for field install.

Drain Pan

The drain pan is internally sloped toward the drain connection. The drain should be checked before initial startup, and periodically thereafter to assure that the drain is clear. If the drain is clogged, steps should be taken to clear the debris so that condensate will flow easily.

Condensate Trap

Install drain line and trap in accordance with all applicable codes. A slope of 1/8 in. per 1 ft. of condensate drain line run is necessary for adequate condensate drainage. Insulate the drain line to prevent sweating. Supports are required for the drain line to prevent excessive stress on the drain pan. A drain trap may be required by local codes and is recommended for odor control. Each drain pan should be individually trapped. See Figure below for details.



H = Maximum negative static pressure + 1

J = H/2

L = H + J + Pipe diameter + Insulation

Electrical Connections

The unit nameplate lists the unit electrical characteristics such as the required voltage, fan and heater amperage, and required circuit ampacity. The unit-wiring diagram shows all unit and field wiring. Because each project can be different and each unit on a project may be different the installer must be familiar with the wiring diagram and nameplate on the unit before beginning any wiring. An adequately sized fuse, circuit breaker, or disconnect that meets local and national electric codes must be supplied. All electrical connections should be checked for tightness before startup. All field-installed components should be located and checked for proper function and compatibility. All internal components should be checked for shipping damage and any loose connections should be tightened to prevent any problems during startup. Any devices furnished by the factory for field installation must be wired in strict accordance with the applicable wiring diagrams. Failure to do so could result in personnel injury or damage to the equipment and will void all manufacturers' warranties.

Dimensions are in inches (mm).

Start Up

General

Before beginning any startup operation all start up personnel should familiarize themselves with the unit options, accessories, and control sequence to understand the proper system operation. All personnel should have a good working knowledge of the general start up procedures along with the appropriate start-up guides and balancing guides available. The building must be completely finished with all doors, windows, interior walls and insulation in place. The entire building should be as complete as possible before beginning any system balance. Before any startup operations occur a final visual inspection should be made of the system. Once it has been established that the installation is correct, complete, and no foreign articles have been left in the units or other areas the startup procedure can begin.

Cooling/Heating System

Before the water system is started and balanced the chill/hot water systems should be flushed to remove any contaminant that might collect in the system during construction. All unit service valves must be in the closed position during this operation to keep foreign matter from entering the unit and clogging the valves. Strainers should be installed in the piping mains to prevent this material from entering the units while they are operating. During the filling of the system the vent valve on top of the coil should be turned counter clockwise one and one-half turns so any trapped air in the coil can escape.

CAUTION: The coil air vents are not to be used to bleed the entire system. The main piping must have air vents installed in it where potential air traps could be located. Some systems may require repeated venting over a period of time to properly eliminate air from the system.

CAUTION: DO NOT exceed coil's parameters. The coil's water temperature range is 40°F - 200°F. For standard coil wall thickness 0.016", the coil's maximum working pressure is 250 PSIG. For optional coil wall thickness 0.025", the coil's maximum working pressure is 350 PSIG.

Electric Resistance Heater Assembly

Electric resistance heaters typically require no normal periodic maintenance when unit air filters are changed properly. The two most important operating conditions for an electric heater are, proper air flow, and proper supply voltage. High supply voltage or insufficient airflow will cause the heater strips to cycle on the high side. The strip heaters are equipped with automatic reset switches to prevent overheating of the unit. Once the switches are tripped the heater will remain off until it cools past the lower set point for the trip switches to reset. If the trip switches actuate, the system should be checked and any condition causing the high limit cutout must be corrected immediately.

Normal Operation and Periodic Maintenance

ALL POWER MUST BE SWITCHED OFF BEFORE SERVICING.

General

Each unit on a job will have its own unique operating environment and conditions that will dictate the maintenance schedule for that unit. A formal schedule and maintenance log and an individual unit log should be established and maintained to establish max performance and service life. Information regarding safety precautions contained in the preface at the beginning of this manual should be followed during any service and maintenance operations.

Motor Blower Assembly

Nailor uses permanently lubricated motors that do not require field lubrication to ensure a long trouble-free blower life. However, should it become necessary, the blower assemblies in these units are easily removable. Disconnect wiring from the control panel. Removing the nuts located in the top and bottom left and right corners of the unit discharge panel allows the blower assembly to be removed from the unit. To reinstall the blower assembly, repeat the removal sequence in reverse order, making sure to reconnect all wiring harnesses. Dirt and dust should not be allowed to accumulate on the blower wheel or housing. This can result in an unbalanced blower wheel and damage the wheel or motor. The wheel can be cleaned periodically with a vacuum cleaner and brush.

Coil Assembly

To access coils for servicing, remove the bottom access panel of the blower section. Coils may be cleaned by brushing the coil face with a soft brush. The brush strokes should be in the direction of the fin never across the fin. Cleaning with a vacuum cleaner should follow this. If compressed air is available the coil may be cleaned by blowing air through the coil from the leaving air-side. Vacuuming should follow this procedure also. Even coils that have the filter changed on a regular basis still require cleaning periodically.

Filters

Return air filters should be replaced on a regular basis. The time interval between each replacement should be established based on inspection of the filter. If the replacement filters are not purchased from the factory, the filters used should be the same type and size as those furnished from, or recommended by the factory.

Dimensions are in inches (mm).

Inspection, Installation & Start-up Checklist

Receiving & inspection

- Unit received & inspected for damage
- Unit configuration correct (left/right hand)
- Unit arrived as ordered
- Unit arrived with correct structural support components

Handling & installation

- Mount unit level and square
- Electrical service provided is correct
- Proper disconnect switch installed
- Unit is accessible for operations and maintenance
- Overcurrent protection installed is correct
- Utilities to unit comply with local code
- Flush chilled/hot water lines with unit service valves closed
- Correct hot water line to the unit
- Correct chilled water line to the unit
- Piping strainers installed correctly
- Shipping components removed

Cooling/heating connections

- Shield valve package components from heat
- Field installed piping connected to unit
- Required drain line and traps installed
- Install condensate pan under piping as required
- Valve packages installed correctly
- Pressure test unit and piping for leaks
- Required piping insulation is correct
- Supply/return lines installed to correct coil connections

Ductwork connections

- All required fittings, grilles and ductwork installed correctly
- Control outside air for freeze protection
- Supply and return grilles size and type are correct
- All ductwork insulated as required

Electrical connections

- Refer to unit wiring diagram
- All field wiring in compliance with local code
- Incoming power service(s) connected

Unit start-up

- Visual inspection of unit and system
- Record ambient temperature
- Check wiring for secure connections
- Unit isolation valves closed
- Fill systems with water
- Check water lines for leaks
- Ductwork and grilles installed in correct location
- Start fans, pumps, chillers, etc.
- Check ductwork and units for air leaks
- Check for correct damper operation
- Check for correct heating operation
- Record electrical supply voltage
- Vent water systems as required
- All unit panels and filters in place
- Check for overload condition of all units
- Balance air systems as required
- Balance water systems as required
- Check for vibrations in piping and ductwork
- Check for correct cooling operation
- Reinstall access panels and covers
- Record final settings for future use



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